Mac OS X
Development Tools Overview

Session 900

Mac OS X
Development Tools Overview

Godfrey DiGiorgi
Technology Manager, Development Tools

Welcome!

- Mac OS X Development Tools: a strategic asset
- 'The Ultimate Development System'

Mac OS X
Development Tools Overview

Ted Goldstein
Vice President, Apple Development Technologies

Development Technologies

- What is our charter?
- Progress report
- Our partners
- New initiatives

Build a Big Tent

- Carbon and Cocoa developers
- Multi-platform Java developers
- Database and web developers
- UNIX developers
- Scripters

Which Technology?

- Cocoa: New apps unique and special to Mac OS X

- Carbon: Existing apps from Mac OS 9

- Java: Cross-platform development

- AppleScript Studio: Rapidly evolved apps, especially ones that integrate multiple apps

- Perl/Tcl/Python: UNIX cross-platform apps

Strategy: Innovate on Standards

- Standard command line tools for reliability
    - GNU Compilers, linkers, editors
- Interactive tools for rapid development
    - Interface Builder
    - Project Builder
    - WebObjects Builder
- Application servers for scalability
    - WebObjects
    - Apache Tomcat

Apple Development Tools

| Desktop Apps | Web Apps | Device Drivers | Frameworks |

| Performance Tools | AppleScript Studio | WebObjects Tools |

| Project Builder | Interface Builder |

| C | C++ | Java | Objective-C | AppleScript |

We've Heard Your Concerns

- C++ compliance
- Better code generation
- Project Builder user interface
- Compile time

Improving Compile Time

- Faster C++ template instantiation
- Turn GCC into Compile Server
- Faster parser
- Optimize memory footprint
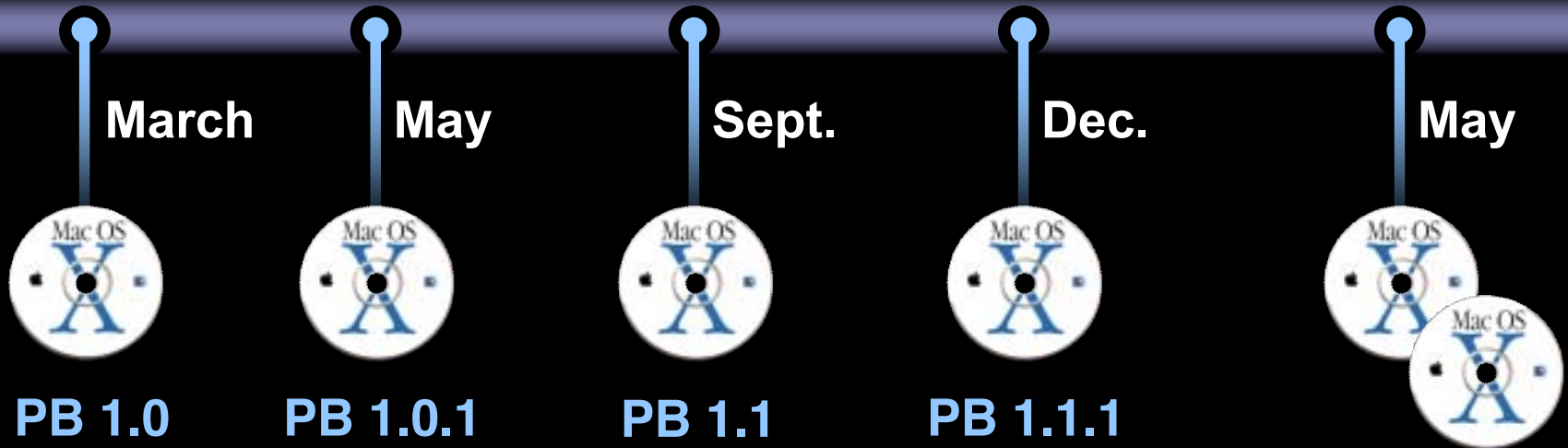- Faster links through less debug symbol handling

Mac OS X
Development Tools Update

Dave Payne
Manager, Mac OS X Development Environment

A Year of Achievement

2001   **2002**

March   May   Sept.   Dec.   May

PB 1.0   PB 1.0.1   PB 1.1   PB 1.1.1

Support   Class Browser AppleScript
for WO 5 Integrated Doc Views Studio 1.0

Objective-C++
2-Level Namespace

April 2002 Developer Tools CD

- For use on Mac OS X v10.1

- Project Builder 2.0 Beta
- GCC 3.1 Beta
- AppleScript Studio 1.1
- New documentation

Jaguar Developer Tools CD

- For use on Jaguar Developer Preview

- Can build apps compatible with earlier Mac OS X releases

- GCC 3.1 is now the default system compiler

Tools Available Far and Wide

- Included in Mac OS X retail box

- Included with all new Macintosh systems

- ADC delivery of Developer Tools CDs

    - Mailed to all ADC Premier and Select members

    - Free download to all ADC members

    - $20 CD fulfillment program from ADC

    - See **http://connect.apple.com**

Project Builder 2.0

- Configurable multi-window UI
- Support for GCC 3.1
  - New precompiled header mechanism
  - Integrated seamlessly with PB
- Build system improvements
- Debugger improvements

- See "Exploring Project Builder" on Wednesday

Project Builder Design

- Tailored specifically for Mac OS X
- A great IDE leveraging the power of UNIX
  - Built-in build system, or use your own
  - Shell script build phases
  - Scriptable command line builds with '**pbxbuild**'
- Facilitate team development
  - App preferences for each user
  - Project settings for each user
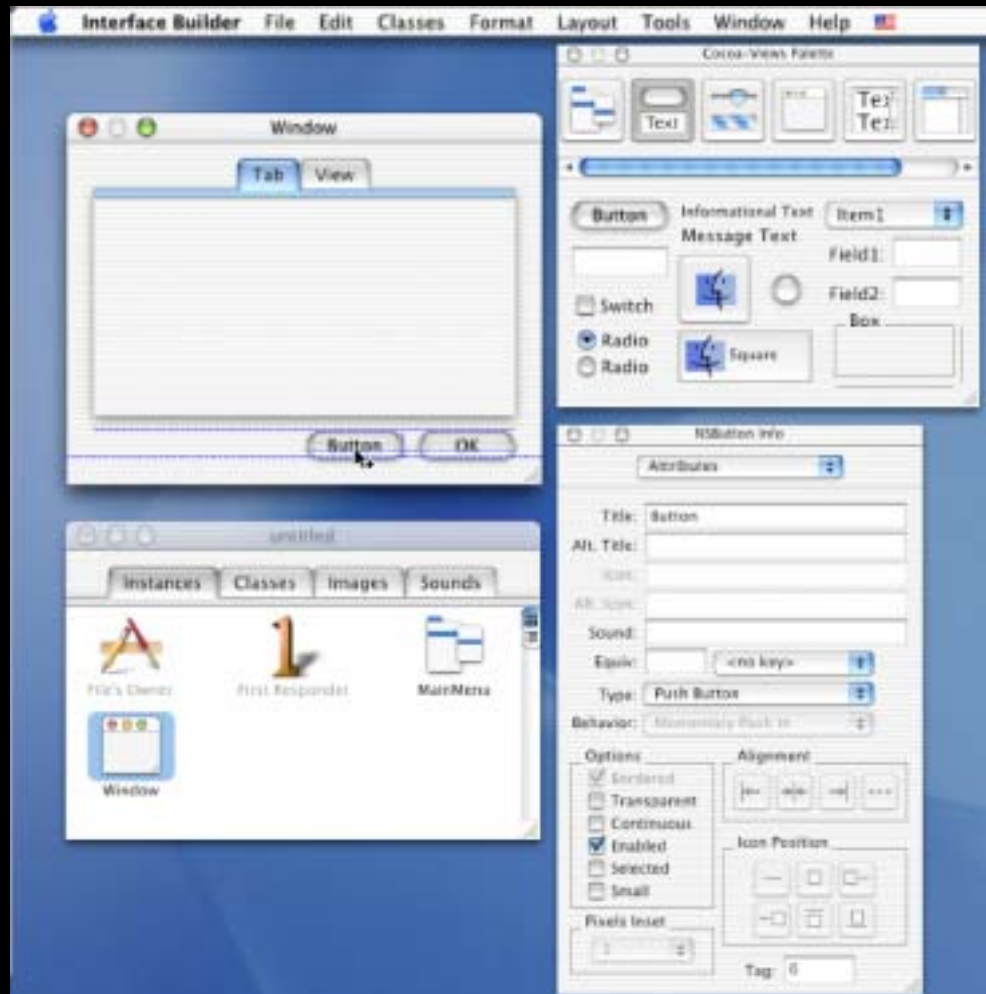 - Integrated with CVS version control system

Demo

Project Builder 2.0

Mike Ferris
Manager, Project Builder Team

Interface Builder

Build Aqua-Compliant User Interfaces for Carbon, Cocoa, & AppleScript Studio

Interface Builder 2.3 Update

- Support for Jaguar's new Cocoa archiving
    - Better forward and backward compatibility
- Typed outlets
- Views can be dragged between containers
- Grouping and locking of UI elements

- See "Using Interface Builder" on Thursday

GCC 3.1

- Faster build times (up to 6x for C++)
- C99 Compliance
- C++ ANSI Compliance
- Full C++ Standard Template Library (STL)
- Better code generation
  - AltiVec fastest of any compiler
- See "Compiler Developments" on Friday

Debugger Status Update

- View opaque data types
- Expression watch window
- Hardware watchpoints

- See "Debugging in Mac OS X" on Friday

Performance Tools

	Memory Use	Execution Behavior	Resource Use
Monitor	top heap vmmap	top Thread Viewer	fs_usage sc_usage QuartzDebug
Analyze	MallocDebug ObjectAlloc	Sampler Shikari MONster	Sampler OpenGL Profiler

Near-Term Priorities

- Improved build times
- Even better code generation
- Extensibility APIs in Project Builder
- Command execution worksheet
- More debugging features

Third-Party Tools

Godfrey DiGiorgi
Technology Manager, Development Tools

Collaboration

- Work closely with third-party tool vendors
  - Engineering directions
  - Business coordination

Many Vendors . . .

4D, Inc.
Aladdin Knowledge Systems
Borland Software Corporation
Cityview Software
Critical Path Software, Inc.
Crywolf, Inc.
CoolMacStuff.com
DevDepot
DrawWell Technologies Ltd.
eSellerate/MindVision Software
Eskape Labs, A Division of
Hauppauge Digital Incorporated
FileMaker, Inc.
FrontBase, Inc.
Granite Digital
Griffin Technologies, LLC
Jiiva, Inc.
LaCie Ltd. USA
Lingo Systems
MacTech Magazine

Metrowerks Corporation
Microspot Ltd.
MultiAd
Netopia, Inc.
OpenBase International Ltd.
Oracle Corporation
PACE Anti-Piracy
Perforce Software, Inc.
REAL Software
ReportMill Software, Inc.
Robosoft Technologies
Runtime Revolution Limited
Simple Factors
Singlestep Technologies
Sybase
Testing Testing 123
The Iconfactory
WIPRO Technologies, Ltd.
Zero G

Many Vendors . . Many Products

4D, Inc.

Aladdin Knowledge Systems

Borland Software Corporation

Cityview Software

Critical Path Software, Inc.

Crywolf, Inc.

CoolMacStuff.com

*DevDepot

DrawWell Technologies Ltd.

eSellerate/MindVision Software

Eskape Labs, A Division of
Hauppauge Digital Incorporated

FileMaker, Inc.

FrontBase, Inc.

Granite Digital

Griffin Technologies, LLC

Jiiva, Inc.

LaCie Ltd. USA

Lingo Systems

MacTech Magazine

Metrowerks Corporation

Microspot Ltd.

MultiAd

Netopia, Inc.

OpenBase International Ltd.

Oracle Corporation

PACE Anti-Piracy

Perforce Software, Inc.

REAL Software

ReportMill Software, Inc.

Robosoft Technologies

Runtime Revolution Limited

Simple Factors

Singlestep Technologies

Sybase

Testing Testing 123

The Iconfactory

WIPRO Technologies, Ltd.

Zero G

Development Environments

CodeWarrior

REALbasic

Runtime Revolution

Editors

BBEdit

Installers

InstallAnywhere

InstallerMaker

InstallerVISE

Performance Analysis

AppBeat

Source Control

VOODOO

Perforce

WWDC Exhibit Fair

- **Monday . . . . 5:00pm to 8:00pm**
- **Tuesday . . . . 9:00am to 6:00pm**
- **Wednesday . . . . 9:00am to 6:00pm**

REALbasic for Mac OS X

Geoff Perlman
President and CEO, REAL Software, Inc.

REALbasic

REALbasic—Cross Platform

- Compiled to machine code for each platform
- Modern, Object-Oriented language
- Native performance and UI
- Rich library of intrinsic functions and classes
- Cross-platform plug-in API
- Write once, deploy many
  - Mac OS 8 & 9, Mac OS X and Windows 95-XP

REALbasic

What's New?

- Core graphics text rendering across the board
- ATSUI-based editfield
- External project items
- Interactive shell
- Mac OS X Serial Port Support
- Hundreds of IDE, intrinsic library improvements

REALbasic

REALbasic @ WWDC

- Visit us at the Exhibit Fair
  Hall 1

- REALbasic Birds of a Feather
  Tuesday, 7:30pm–9:00pm, Room K

- REAL Software Lunch Presentation
  Friday, 12:30pm–1:30pm, Hall 2

REALbasic

Metrowerks CodeWarrior

- Leading Mac OS Development tool
  - Building Mac OS software since 1993
  - Building Mac OS X software since 1997
  - Many commercial Mac OS apps are built with CodeWarrior

- Coming soon: CodeWarrior for Mac OS, v8

CodeWarrior for Mac OS, v8.0

- Cool things about 8.0:
    - New and faster Mach-O Linker
    - Improved debugger performance
    - Custom debugger data viewers
    - C++ and Java code completion
    - Builds Cocoa software
    - Much, much more . . .

- Available May 31!

Metrowerks @ WWDC

- Metrowerks Lunch Presentation
  Tuesday, 12:30pm–1:30pm, Hall 2

- CodeWarrior Birds of a Feather
  Tuesday, 7:30pm–9:00pm, Hall 2

- CodeWarrior Lounge
  Tuesday and Wednesday, 8:00am–6:00pm,
  Hilton Plaza Room

- Metrowerks Booth
  Exhibition hours, Hall 1

Mac OS X
Development Tools Initiatives

Ted Goldstein
Vice President, Apple Development Technologies

New Initiatives

- Database Integration
- Objective-C futures
- Web Services

ODBC Connectivity

- Darwin Open Source Solution
- OpenLink's iODBC Driver Manager
- Works with third-party ODBC drivers
- Great for legacy development

Enterprise Objects Framework

- Object-oriented database access
- Easily connect data objects to user interface widgets
- Past, Present, Future

EOF Past

+ Clean Objective-C integration with Cocoa and IB

– Limited database adaptors

– Tied to older versions of WebObjects

EOF Present

+ Using Java we leverage other work in Java community including JDBC

+ Evaluation redistribution license available today !

– Requires Objective-C programmers do a little Java programming

Detail

Save   Revert   Undo   Redo

Listing Number:
Asking Price:
Bedrooms: Bathrooms:
Size: Lot:
Year:

Address
Street: Apt #:
City: State: Zip:

Cocoa-EnterpriseObjects

Text   Te: / Te:
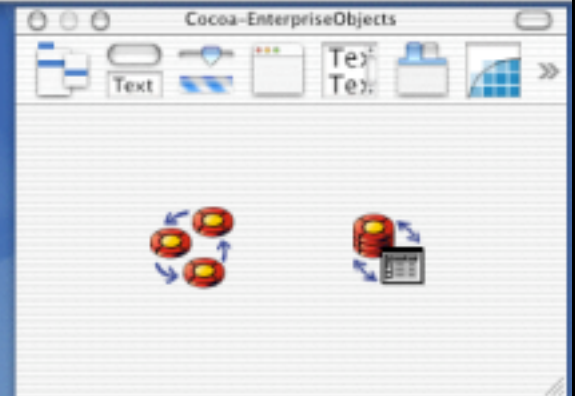
NSTextField Info

Connections

EOTextAssociation   Listing

= value   askingPrice
= URL   bathrooms
= enabled   bedrooms
= textColor   canChange
= backgroundColor   ▶ features
= bold   isSold
= italic   listingFeatures
target   listingID
delegate   listingNumber

Source	Destination
enabled	canChange (Listing)
value	listingNumber (Listing)

Revert   Disconnect

Detail.nib

Instances   Classes   Images   Sounds

File's Owner   First Responder   Window

EditingContext   Listing

Glue Code

```
public class Controller extends NSObject {
    void showData() {
        NSApplication.loadNibNamed ("EOFInterface", this);
        EOQualifier q = EOQualifier.qualifierWithFormat ("name='Goldstein'");
        EOFetchSpecification fs = new EOFetchSpecification ("Person", q);

        NSArray objects = editingContext.objectsWithFetchSpecification (fs);
        displayGroup.setObjectArray (objects);
        window.makeKeyAndOrderFront (this);
    }
}
```

EOF Future

- Improve runtime efficiency
- Choice of programming language
- Native Objective-C types
- Palette integration for EOF and Interface Builder
- Drive improvements to Objective-C

Commitment to Objective-C

- Primary language for desktop applications
- Investigating improvements
- Improve the interaction with other languages

Web Services Direction

- XML and SOAP integrated across all technologies
  - AppleScript Vocabulary
  - C, C++, Objective-C Core Services
  - Java JAX Frameworks
  - WebObjects Direct to Web Services
  - Sherlock 3
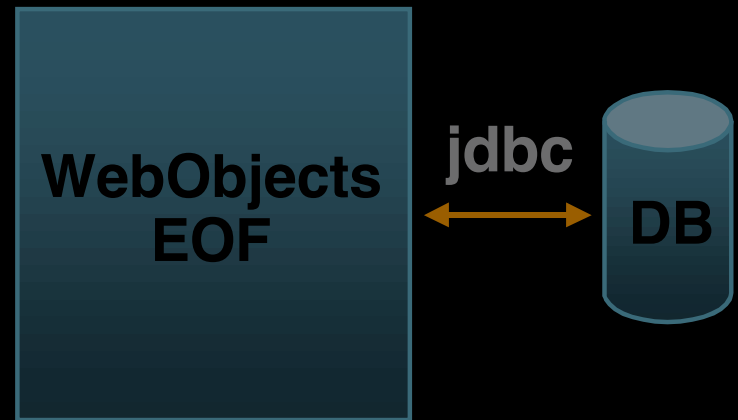 - Apache Tomcat Axis on Mac OS X Server

Demo

**Web Services With
WebObjects and AppleScript Studio**

Francois Jouaux
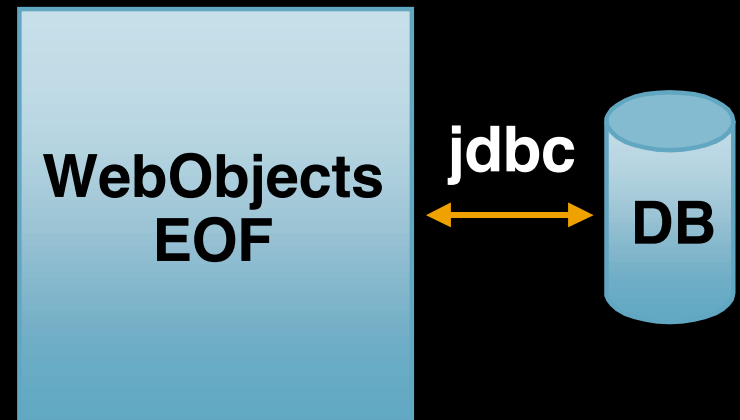
Tim Bumgarner

Web Services Server

WebObjects EOF **jdbc** **DB**

Built With:

Direct To Web Services

Web Services Server

WebObjects EOF **jdbc** ←→ **DB**

Built With:

Direct To Web Services

Web Services Client

Web Services Server

AppleScript

XML/SOAP

**WebObjects
EOF**

jdbc

DB

Built With:

AppleScript Studio

**Direct To
Web Services**

In Summary

- Focus on great development tools
- Collaboration with tool partners
- Extending to new initiatives

- Sessions to watch for through the week . . .

Roadmap . . A Full Week

901 Command-Line Development Tools
902 AppleScript Studio Introduction
903 Exploring the Project Builder IDE
904 Using Interface Builder
905 Apple Performance Tools
906 Developing for Performance
907 Compiler Developments at Apple
908 Delivering With Project Builder
909 Debugging in Mac OS X

400 Java and Apple: State of the Union
401 Java Graphics
402 J2SE Mac OS X Platform Overview
403 Java in the Browser
404 Tailoring Java Applications for Mac OS X
405 Java Web Services
406 Java Virtual Machine Internals
407 Java Performance
408 QuickTime for Java Overview

003 Metrowerks Presentation

**011 Tools for Mac OS X by REAL Software
    & Runtime Revolution**

Exhibit Fair!!!

106 AppleScript Update

804 Client Web Services Frameworks

700 WebObjects: State of the Union
701 WebObjects Technical Overview
702 Introduction to WebObjects Tools
703 Introduction to Enterprise Objects Frameworks
704 XML in WebObjects
705 WebObjects and Web Services
706 Direct to Java Client
707 WebObjects Java Client
708 Enterprise JavaBeans
709 Deploying WebObjects Applications
710 JSP and Servlet Integration
711 Advanced Data Modeling and Connectivity
712 Advanced Enterprise Objects Frameworks
713 WebObjects Solutions
714 Optimizing WebObjects Applications
715 WebObjects Security

Coming Up Next

400 Java and Apple: State of the Union:
Find out what's going on in Java on Mac OS X

Hall 2
Mon., 5:00pm

700 WebObjects: State of the Union:
Hear the latest on WebObjects

Room A1
Tue., 9:00am

804 Client Web Services Frameworks:
See the latest in Apple's web technology

Room J
Tue., 10:30am

901 Command-Line Development Tools:
Discover the familiar GNU tools on Mac OS X

Room A2
Tue., 3:30 pm

For More Information

- Tools
  http://developer.apple.com/tools/

- WebObjects
  http://www.apple.com/webobjects/

- Java
  http://www.apple.com/java/

- AppleScript
  http://www.apple.com/applescript/

Wrapping It Up

- Please attend the Feedback Forums!

  - **FF000 Technical Documentation**
    Wednesday, 10:30am, Room J1

  - **FF003 Java**
    Wednesday, 5:00pm, Room J1

  - **FF015 Development Tools**
    Friday, 3:30pm, Room J1

  - **FF013 WebObjects**
    Friday, 3:30pm, Room A1